

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 6-10, 15-18, 26-37, 45, 49, 51-61, and 69-71 are currently pending, with Claims 6-10 and 15-18 withdrawn as directed to a non-elected invention. Claims 38-44, 46-48, 50, and 62-68 have been canceled without prejudice; Claims 26, 27, 34, 36, 45, 49, 51, 58, and 60 have been amended; and Claims 69-71 have been added by the present amendment. The changes and additions to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, the drawings were objected to under 37 C.F.R. § 1.83(a) as failing to show the second element isolation region; Claims 26, 45, 47, 48, and 50 were rejected under 35 U.S.C. § 112, first paragraph, regarding the second element isolation region; Claims 26, 29, 38, 42, 45, 46, 49, 53, 62, and 66 were rejected under 35 U.S.C. § 103(a) as being unpatentable over “admitted prior art Figures 1-2D” (hereinafter “Figures 1-2D”) in view of U.S. Patent No. 5,893,741 to Huang (hereinafter “the ‘741 patent”) and U.S. Patent No. 5,766,996 to Hayakawa et al. (hereinafter “the ‘996 patent”);¹ Claims 27 and 51 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Figures 1-2D, the ‘741 patent, and the ‘996 patent, further in view of U.S. Patent No. 5,348,898 to Yatsuda et al. (hereinafter “the ‘898 patent”); Claims 28 and 52 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Figures 1-2D, the ‘741 patent, and the ‘996 patent, further in view of U.S. Patent No. 4,467,452 to Saito et al. (hereinafter “the ‘452 patent”); Claims 30, 31, 54, and 55 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Figures 1-2D, the ‘741 patent, and the ‘996 patent, further in view of U.S.

¹ Applicants note that, although Claims 46 and 49 were rejected under 35 U.S.C. § 103, Claim 48, which depends from Claim 46 and from which Claim 49 depends, was not rejected. Thus, Applicants believe the omission of Claim 48 is an oversight. Accordingly, Applicants will assume Claim 48 was intended to be rejected under 35 U.S.C. § 103 under the same grounds as Claims 46 and 49.

Patent No. 5,731,130 to Tseng (hereinafter “the ‘130 patent”); Claims 32, 33, 56, and 57 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Figures 1-2D, the ‘741 patent, and the ‘996 patent, further in view of U.S. Patent No. 4,866,003 to Yokoi et al. (hereinafter “the ‘003 patent”); and Claims 34-37, 39-41, 43, 44, 58-61, 63-65, 67, and 68 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Figures 1-2D, the ‘741 patent, and the ‘996 patent, further in view of U.S. Patent No. 6,211,548 B1 to Ma (hereinafter “the ‘548 patent”).²

Applicants respectfully submit that the objection to the drawings is rendered moot by the present amendment to the claims. The claims have been amended to no longer recite a second element isolation region.

In response to the rejection of Claims 26, 45, 47, 48, and 50 under 35 U.S.C. § 112, first paragraph, independent Claims 26 and 45 have been amended to no longer recite the second element isolation region. Accordingly, Applicants respectfully submit that the rejection of the claims under 35 U.S.C. § 112 is rendered moot by the present amendment to Claims 26 and 45.

Amended Claim 26 is directed to a non-volatile semiconductor memory device, comprising: (1) a semiconductor substrate having a peripheral circuit region and a memory cell region; (2) a first element region provided in the memory cell region; (3) a second element region provided in the peripheral circuit region; (4) a memory cell having source and drain diffusion layers each provided in the first element region; (5) a peripheral transistor having source and drain diffusion layers each provided in the second element region; (6) an element isolation region being in contact with the first element region; (7) an insulating film covering the memory cell, the peripheral transistor, and element isolation region, and containing an insulator different from the element isolation region; (8) an inter-level

² Applicants note that Claims 47 and 50 were not rejected, but also were not indicated as allowable.

insulating film provided on the surface of the insulating film, the inter-level insulating film containing an insulator different from the insulating film; (9) a contact hole provided in the inter-level insulating film and the insulating film, the contact hole reaching at least one of the source and drain diffusion layers of the memory cell and overlapping the element isolation region; and (10) a contact plug provided in the contact hole, the contact plug being in contact with at least one of the source and drain diffusion layers of the memory cell, the insulating film, and the inter-level insulating film. The changes to Claim 26 are supported by the originally filed specification and do not add new matter.³

Applicants respectfully submit that the rejection of Claim 26 (and dependent Claim 29) is rendered moot by the present amendment to Claim 26.

Regarding the rejection of Claim 26, the Office Action asserts that Figures 1-2D disclose everything in Claim 26 with the exception of (1) an insulating film being harder for an oxidizing agent to pass therethrough compared with a silicon oxide film, and (2) the insulating film being oxidized, and relies on the '741 and '996 patents to remedy those deficiencies.

Figures 1-2D illustrate a cross-sectional view of a conventional NAND-type EEPROM. However, as admitted in the Office Action, Figures 1-2D fail to disclose an oxidized insulating film being harder for an oxidizing agent to pass therethrough, compared with a silicon oxide film. However, Applicants respectfully submit that Figures 1-2D also fail to disclose an insulating film covering a memory cell, the peripheral transistor, and the element isolation region. Further, Figures 1-2D fail to disclose an inter-level insulating film provided on the surface of insulating film, wherein the inter-level insulating film contains an insulator different from the insulating film. Figures 1-2D do not disclose an inter-level insulating film having an insulator other than the insulating film 105. Further, Applicants

³ See, e.g., Figures 3A, 9A, 9B, 10A, 10B, and page 18 of the specification.

respectfully submit that Figures 1-2D fail to disclose a contact hole provided in the inter-level insulating film and the insulating film, and a contact plug provided in the contact hole, the contact plug being in contact with at least one of the source and drain diffusion layers of the memory cell, the insulating film, and the inter-level insulating film, as recited in amended Claim 26.

The '741 patent is directed to a method for simultaneously forming a local interconnection for source-drain transistors. However, Applicants respectfully submit that the '741 patent fails to remedy the deficiencies of Figures 1-2D, as described above. In particular, Applicants respectfully submit that the '741 patent fails to disclose the insulating film, the inter-level insulating film, the contact hole, and the contact plug recited in amended Claim 26.

The '996 patent is directed to a semiconductor device having an insulating film 11 that contains silicon nitride. However, Applicants respectfully submit that the '996 patent fails to disclose the insulating film, the interlevel insulating film, the contact hole, and the contact plug recited in amended Claim 26.

Thus, no matter how the teachings of Figures 1-2D, the '741 patent, and the '996 patent are combined, the combination does not teach or suggest the insulating film, the inter-level insulating film, the contact hole, and the contact plug recited in amended Claim 26. Accordingly, Applicants respectfully submit that amended Claim 26 (and dependent Claim 29) patentably define over any proper combination of Figures 1-2D, the '741 patent, and the '996 patent.

Claim 45 recites limitations analogous to the limitations recited in Claim 26. Moreover, Claim 45 has been amended in a manner analogous to the amendment to Claim 26. Accordingly, for the reasons stated above for the patentability of Claim 26, Applicants

respectfully submit that the rejection of Claim 45 (and dependent Claim 53) is rendered moot by the present amendment to Claim 45.

Regarding the rejection of dependent Claims 27, 28, 30-37, 51, 52, and 54-61, Applicants respectfully submit that the '898 '452, '130, '003, and '548 patents fail to remedy the deficiencies of Figures 1-2D, the '741 patent, and the '996 patent, as discussed above. Accordingly, Applicants respectfully submit that the rejection of those dependent claims is rendered moot by the present amendment to Claims 26 and 45. Further, Applicants respectfully submit that the rejections of dependent Claims 38-44, 46-48, 50, and 62-68 are rendered moot by the present cancellation of those claims.

The present amendment also sets forth new dependent Claims 69-71 for examination on the merits. New Claims 69 and 70 depend from Claim 26, while new Claim 71 depends from Claim 45. New Claims 69-71 are supported by the originally filed specification and do not add new matter. Further, based on the asserted allowability of independent Claims 26 and 45, Applicants respectfully submit that new Claims 69-71 patentably define over the applied references.

Thus, it is respectfully submitted that independent Claims 26 and 45 (and all associated dependent claims) patentably define over any proper combination of Figures 1-2D and the '741, '996, '898, '452, '130, '003, and '548 patents.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Eckhard H. Kuesters
Attorney of Record
Registration No. 28,870
Kurt M. Berger, Ph.D.
Registration No. 51,461

Customer Number

22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/03)
KMB/rac

I:\ATTY\KMB\0039\7692\00397692US-AM.DOC